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MAGNUS

MAGNUS

DEPENDABLE MARINE POWER

Introduction: Magnus Marine

Why connect to shore power?

- Zero emissions and pollution in harbour
- Reduced onboard maintenance and energy costs
- No noise or vibration, greatly improving onboard comfort for crew and guests
- No interference with neighbouring berths
- No engineer supervision necessary
- Exterior and interior kept clean and stain-free
- Reduced demand for fuel bunkering, which saves cost and time
- Minimal maintenance and servicing required
- Increase in yacht's resale value
- Complies with future harbour and government demands

Why use a shore power converter rather than an isolation transformer?

- Connection to any worldwide shore supply: 50 or 60 Hz
- No inrush, leakage current or phase sequence complications, making connection quick and simple
- Protects onboard equipment from shore faults such as sags and surges
- Regulated output with no crew intervention
- Clean output power for all onboard equipment, including sensitive audio devices
- No power disturbances when changing supplies: shore to generator and vice versa
- Can run in parallel with onboard generators when extra power is required
- Modular design reduces onboard space requirements
- No hassles or doubts – just ease and simplicity

MAGNUS MARINE

World-class design and manufacturing – delivering dependable marine power to the world's finest yachts.

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Magnus Marine systems are built to deliver dependable marine power – wherever you happen to be in the world. Chosen by many of the world's leading shipyards and luxury yachts, our systems guarantee comfort, convenience and safety. No more flickering lights, loss of picture on your television or your computers misbehaving – just a flawless supply.

Built for tomorrow's yachts, our systems significantly reduce harmful emissions and ensure the ultimate in quiet power provision when in harbour.

Every Magnus system is engineered precisely for an individual yacht and it's power requirements. While we are confident our systems will never let you down, all our products are backed by an exemplary support package which offers you total peace of mind which lasts well beyond purchase and installation.

Our purpose-built engineering site in the UK, boasts facilities which include 3D-modeling design and manufacture, with the latest high power test equipment for full factory testing.

Dedicated to serving our worldwide client base, we also have engineering support available in France, New Zealand and the USA.

UNIQUE BENEFITS

1. Performance guaranteed
2. Customised design offering huge flexibility which maximises space and improves ventilation
3. We supply more than a product; from commissioning to assistance throughout the build or refit, we are part of the team

Maximum power availability with worldwide plug and play connectivity to single or three phase shore supplies.

SP100 SHORE POWER CONVERTER

SERIES 12 TO 80 KVA

Connection to any shore supply, one or three phases

Connection to any of the common worldwide shore voltage and frequencies, single or three phases. As a result, connection can be made to shore quickly and without fuss, no matter where the yacht is berthed.

Maximises power availability

Active front-end technology enables maximum power transfer from shore and complies with proposed marina power quality regulations. Control of the shore current prevents tripping of sensitive shore circuit breakers with both low earth leakage and transient current protection.

Continuous clean output power

The output module delivers a clean, stable supply suitable for all types of onboard loads, from utility services (heating, lighting and air conditioning) to entertainment (television and audio) to marine (winch, pumps and navigational equipment).

Graphical display

A colour graphical 7" display provides a clear assessment of the system and its load. Data logging and events can be accessed locally or remotely through a network.

Marine class

Lightweight aluminium construction delivers IP44 protection against engine room dust and swarf. The converter can be bulkhead or deck mounted and can be split into multiple sections to facilitate installation.

TOP 3 SELLING POINTS

1. Reliability and performance guaranteed
2. Single or three-phase plug-and-play connectivity
3. Shore+ boosts power availability on low voltage supply pedestals

Product Selection: SP100 Shore Power Converter

Benefits

- Full galvanic isolation from shore
- Quick and easy connection for crew
- Exceeds shore supply quality regulations
- Extra power availability on low voltage shore supplies
- Protection from shore supply faults
- No interference with sensitive equipment
- Ventilation design prevents heat recirculation
- Real time data logging and event through display
- Reliable with low maintenance
- Lower operating cost with better efficiency
- Quiet trouble free operation

Features

- Worldwide operation - single or three phase supply connectivity
- Reliable connection to new generation RCD shore breakers
- No transient current demand on start-up
- Shore+ boost power availability on low voltage supplies
- Maximum power transfer from shore supply to yacht
- Designed for continuous and automatic operation
- Pure sinusoidal clean output supply
- Rugged overload capability
- Low noise operation
- Seamless transfer between shore and generator
- Split cabinet design improves install accessibility

Options

- External synchroniser for seamless transfer
- Additional display for switchboard installation
- Single Point Extraction to improve ventilation
- Cabinet colour
- Water cooling

SP100 SHORE POWER CONVERTER

INPUT	TYPE	1 or 3 phases active rectification
	VOLTAGE	180 to 520 VAC
	FREQUENCY	47 to 64 Hz
	DISPLACEMENT POWER FACTOR	Unity
OUTPUT	TYPE	Single or 3 phases, neutral, isolated earth*
	VOLTAGE	208 to 480 VAC
	FREQUENCY	50 or 60 Hz
	VOLTAGE DISTORTION	< 2.0% (linear load)
	OVERLOAD	10 minutes 125% 30 seconds 150%
ENVIRONMENT	PROTECTION	Thermal, overload, short circuit
	OPERATING TEMPERATURE	0 to 45°C
	HUMIDITY	< 95% non-condensing
	EFFICIENCY OF SYSTEM	> 92% typical (at full power)
	COOLING	Forced ventilation/water cooling optional
	NOISE	< 75dBA @ 2m
	ENCLOSURE	IP44
	MOUNTING	Bulkhead or floor
	COLOUR	Powder-coated RAL 9010
	INTERFACE	7" graphical display with history and data log Digital I/O for control and monitoring Modbus RTU RS485

**Specified on order. All specifications are subject to change.*

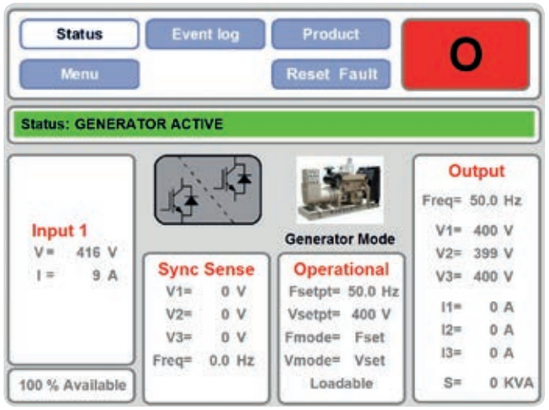
SP100 SERIES	SHORE CORD	HEIGHT (MM)	WIDTH (MM)	DEPTH (MM)	WEIGHT (KG)
OUTPUT: SINGLE PHASE 230V 50Hz OR SPLIT PHASE 240V 60Hz					
12 KVA	30 Amp	850	1200	400	265
24 KVA	80 Amp	850	1260	400	383
50 KVA	125 Amp	1310	1536	538	680
OUTPUT: 3 PHASE 280V/120V 60Hz					
30 KVA	80 Amp	850	1260	400	318
50 KVA	125 Amp	1310	1466	440	618
80 KVA	200 Amp	1310	1536	538	820
OUTPUT: 3 PHASE 400V/230V 50Hz					
30 KVA	125 Amp	850	1260	400	318
50 KVA	125 Amp	850	1466	440	443
80 KVA	200 Amp	1310	1536	538	610

Water cooling - increase length by 150mm and height by 200mm. External chilled fresh water supply 8-10°C 0.5litres/second

Reliability guaranteed. Customisation standard.

SP200 SHORE POWER CONVERTER

SERIES 60 TO 800 KVA



Maximises power availability

Using the latest modular design, the SP200 provides a highly reliable, clean and efficient shore power conversion system. Active front-end technology on each shore cord input enables maximum power transfer to the yacht. Drawing clean sinusoidal current at Unity Power Factor from any power source not only ensures minimum supply disturbances but increases power availability to its maximum. Multiple input converters can be connected to any supply available.

Protection from shore supply

Grain-orientated transformers, connected directly to the shore cord, guarantee galvanic isolation at the lowest possible weight. No common-mode RFI can reach the shore supply and there is no path for any currents which may be sensitive to the shore supply breaker.

Continuous clean output power

The output converter delivers a stable and clean waveform for powering onboard equipment. Loads range from utility services (heating, lighting and air conditioning) to entertainment (television and audio) to marine (winch, pumps and navigational equipment).

Built-in synchronisation

Built-in synchronisation allows for seamless transfer from shore to generator and vice versa. In addition, automatic synchronisation allows the SP200 converters to start on a live bus, minimising onboard control and automation.

Unique modular design

The modular design makes the system compact and highly serviceable. In the unlikely event of a module failure, the system will continue to operate at a reduced capacity. Modules can be isolated and replaced with minimal downtime. On replacement, each module will automatically be configured ready for service.

TOP 3 SELLING POINTS

1. Reliability and performance guaranteed
2. Latest modular design provides cabinet flexibility
3. Advanced built in module redundancy

Benefits

- Reliability and performance guaranteed
- Lower operating cost with better efficiency
- No interference with sensitive equipment
- Protection from shore supply faults
- Quiet trouble-free operation
- Full galvanic isolation
- Easy connection for crew
- Cabinet customisation as standard

Features

- Worldwide operation, wide input voltage and frequency range
- Compatibility with shore supplies worldwide
- Reliable connection to new generation pedestals with built-in RCD protection; no nuisance tripping caused by earth leakage
- Maximum power transfer from shore supply to yacht
- Designed for continuous and automatic operation
- RFI protection to prevent onboard and shore supply disturbances
- Pure sinusoidal clean output supply
- Rugged overload capability
- Built-in module redundancy without interruption of power
- Seamless transfer between shore and generator
- System can connect to a live bus, minimising control and automation
- Parallel load share with generators for extra power
- Power limiting through soft start and soft stop
- Low-noise operation
- Digital touch-screen user display
- IP44 and 45°C rating as standard

Options

- Multiple independent shore cord inputs
- Single/dual shore cord selector
- Bow/stern thruster operation
- Combined CleanNet™ operation when at sea
- Water cooling
- Shore cord Kw/h display
- Cabinet colour

SP200 SHORE POWER CONVERTER

INPUT	TYPE	3-phase active rectification
	VOLTAGE	180 to 520 VAC (on request)
	FREQUENCY	47 to 64 Hz
	POWER FACTOR	Unity
OUTPUT	TYPE	3 phases, neutral, isolated earth*
	VOLTAGE	208/120 VAC , 400/230 ffVAC
	FREQUENCY	50 or 60 Hz
	VOLTAGE DISTORTION	‹ 2.0% (linear load)
	OVERLOAD	10 minutes 125% 30 seconds 150%
ENVIRONMENT	PROTECTION	Thermal, overload, short circuit
	OPERATING TEMPERATURE	0 to 45°C
	HUMIDITY	‹ 95% non-condensing
	EFFICIENCY OF SYSTEM	› 92% typical (at full power)
	COOLING	Forced ventilation/water cooling optional
	NOISE	‹ 75dBA @ 2m
	ENCLOSURE	IP44
	MOUNTING	Bulkhead or floor
	COLOUR	Powder-coated RAL 9010
	INTERFACE	8.4" Graphical touch-screen Control I/O analogue and digital Modbus RTU RS485

**Specified on order. All specifications are subject to change.*

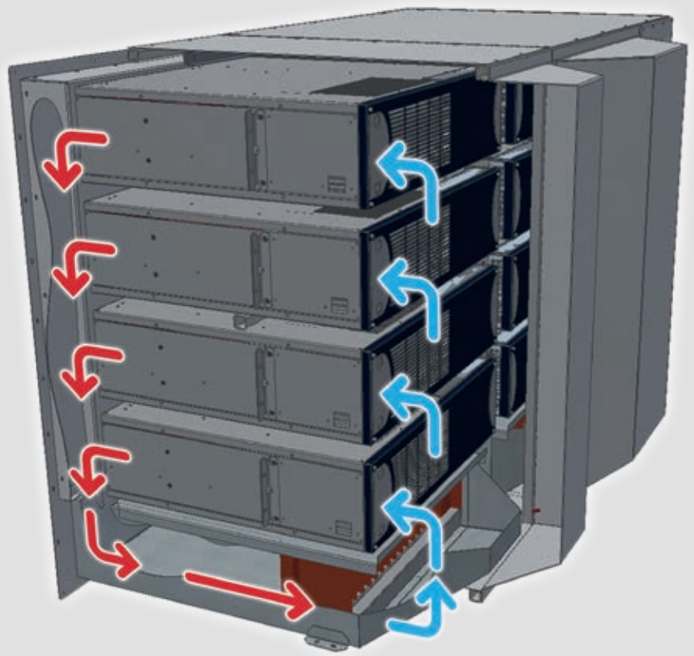
SP200 SERIES	CONFIGUTATION	HEIGHT (MM)	WIDTH (MM)	DEPTH (MM)	WEIGHT (KG)
OUTPUT: SPLIT PHASE 240V/120V 60Hz					
60 KVA	1 Module Pair	1900	800	850	948
120 KVA	2 Module Pair	1900	1100	850	1810
OUTPUT: 3 PHASE 208V/120V 60Hz					
100 KVA	1 Module Pair	1900	1000	850	1028
200 KVA	2 Module Pair	1900	1400	850	2153
OUTPUT: 3 PHASE 400V/230V 50Hz					
100 KVA	1 Module Pair	1160	1010	850	828
200 KVA	2 Module Pair	1400	1300	850	1332
300 KVA	3 Module Pair	1300	2500	850	2171
400 KVA	4 Module Pair	2263	1600	1010	2592
500 KVA	5 Module Pair	1800	2350	1010	3005
600 KVA	6 Module Pair	1800	2600	1010	3648
700 KVA	7 Module Pair	1800	2850	1010	4228
800 KVA	8 Module Pair	1800	3100	1010	4960

For water cooled unit increase depth by 200mm and height by 300-500mm based on power level.
External chilled fresh water supply 8-10°C 0.5-2litres/second.

Product Selection: SP100 & SP200 – Options & Accessories

SP100 & SP200

OPTIONS & ACCESSORIES



Water cooling

Cooling with water significantly improves the performance of the entire system as well as its life expectancy. All heat generated by the system is forced through a heat extraction unit which is chilled by water. Chilled air leaving the heat extraction unit recirculates back into the system as a closed-loop design. Compartment temperature, when the system is online, is well regulated without any additional cooling required. Being sealed noise is also kept to a minimum <70dBA. Fresh water typically 5-12°C.

Single Point Extraction

High-power units can be configured with a Single Point Extraction so heat generated by the Shore Power Converter can be extracted. Controlling the heat improves ventilation in the compartment space efficiently and effectively.

Single/Dual Shore Cord Selector

For harbours with low power availability a second cord can be connected to shore. Each cord input is independent so connection can be made to two completely separate shore supplies.

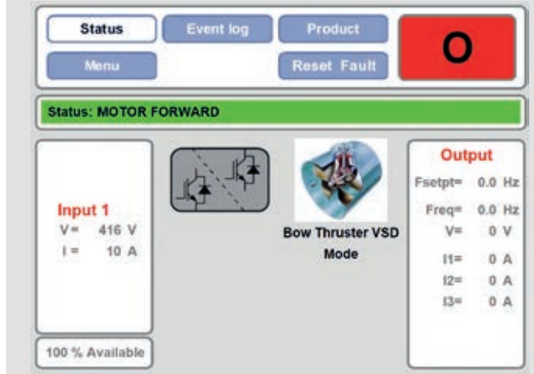
Connection to shore is completely automatic and input phase sequence between cord inputs is non-essential.

Shore cord selection can be configured for single and supplementary shore cord operation.

Parallel load sharing with multiple converter and generators

The SP200 platform is extremely flexible with regards to paralleling with other voltage sources – either generator or multiple converter units. Parallel load-sharing is achievable using profiles programmed into the converter. This allows the converters to share power with other systems without the need for any additional communication signals or supervisory controls.

Isochronous Control available.



Synchronisation for Seamless Transfer

Before a supply is connected to the Main Ship Bus, i.e. generator or shore power, the incoming supply must be synchronised.

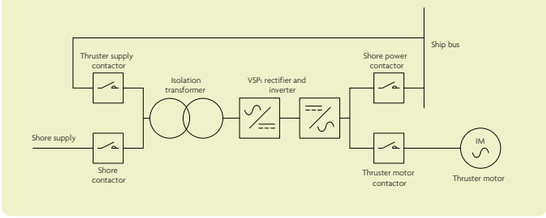
This can be controlled using the Shore Power Converter or generator synchroniser.

The SP100 & SP200 Shore Power Converter series has built-in synchronisation which can be used to enable seamless transfer of the ship's electrical load to and from the converter supply.

For yachts with two generators without any synchronisation equipment, all SP100 & SP200 Shore Power Converters can seamlessly transfer power from shore power to generator and generator back to shore power.

All-in-one shore power and bow/stern thruster operation

The Magnus option to run bow/stern thrusters from the Shore Power Converter, whilst not berthed, offers many advantages. As thrusters and shore power converters do not operate together utilising the same electronics, we can offer impressive space and weight savings. Also, with a pure sinusoidal input and output there are no cable length restrictions or supply disturbances when in operation.



MOTORISED MONOSPIRAL SHORE CABLE REEL.

SHOREFLEX

Designed and developed for the yachting industry to make connection to shore easy, quick and safe.

Product Selection: Shoreflex

PERFECT HANDLING AND STORAGE

1. Greatly Improves safety for crew (no cable chaffing)
2. Prolongs cable life
3. Quick, easy and tidy storage of cable
4. Allows full power operation when partially unwound

A unique dual monospiral reel provides no-fuss storage, maximising space and power usage at the push of a button.

Standard

Lightweight aluminium construction
Ultra-strong design.

Dual monospiral
Partial unwind of cable without derating the ships load, Perfect storing of cable, no twisting, crossing or tangling - maximising shore cable life.

Motorised reeling drum
For total ease of deploying and retrieving shore power cable.
High efficiency geared motor.

Local electrical package
Forward/reverse, e-stop, easy connect package.

Optional

Slip ring operation - always connected
Slip rings uniquely designed to sit within the standard unit offer permanent connection.

Lightweight flexible shore cable
Highest quality marine cables.

Specification

35 metres of stored cable.
Powder-coated RAL 9010

CR_{100} SERIES	CABLE SIZE	HEIGHT (MM)	WIDTH (MM)	DEPTH (MM)	WEIGHT (KG)
100	4 Core 25 to 35mm² O/D 25 to 30mm	880	530	1,100	100
200	4 Core 50 to 70mm² O/D 32 to 38mm	1,040	620	1,250	189
300	4 Core 95 to 120mm² O/D 42 to 47mm	1,250	740	1,450	310
400	4 Core 185 to 240mm² O/D 58 to 65mm	1,335	800	1,540	400

Sizes shown for vertical mounting unit, horizontal mounting dimensions on request. All specifications are subject to change.

Onboard equipment with alternative supply requirements.

FC100 & 200 FREQUENCY CONVERTER

Frequency Converter can be installed onboard and used to power onboard equipment with supply requirements different to that found on the yacht's AC distribution. This might include a 120 VAC/60 Hz (US) supply to cabins on European yachts or 230 VAC/50 Hz (European) to US yachts. Items carried onboard can then readily be used by guests with connection via European or US socket outlets.

Such a converter can also be used to power special equipment, including tenders and specific machinery requiring an alternative supply.

FC100 & FC200 Frequency Converter: Overview

Benefits

- Reliability and performance guaranteed
- Lower operating cost with better efficiency
- No interference with sensitive equipment
- Protects equipment from voltage distortion, voltage sags or frequency instability
- Quiet trouble-free operation
- Fully galvanic isolated output supply
- Pure sinusiodal clean output supply
- Cabinet customisation as standard

Options

- Water cooling
- Cabinet colour

Features

- Minimal supply disturbances with Active Front End as standard
- Maximum power transfer from yachts AC Bus
- Low earth leakage
- Isolated output supply
- Digital touch-screen user display
- RFI protection to prevent supply disturbances
- Pure sinusoidal clean output supply
- Rugged overload capability
- Designed for continuous and automatic operation
- Low noise operation
- IP44 and 45°C rating as standard

INPUT	TYPE	1 or 3 phases active rectification
	VOLTAGE	180 to 520 VAC
	FREQUENCY	47 to 64 Hz
	DISPLACEMENT POWER FACTOR	Unity
OUTPUT	TYPE	Single or three phases neutral, isolated output*
	VOLTAGE	120 to 480 VAC
	FREQUENCY	50 or 60 Hz
	VOLTAGE DISTORTION	‹ 2.0% (linear load)
	OVERLOAD	10 minutes 125% 30 seconds 150%
ENVIRONMENT	PROTECTION	Thermal, overload, short circuit
	OPERATING TEMPERATURE	0 to 45°C
	HUMIDITY	‹ 95% non-condensing
	EFFICIENCY OF SYSTEM	› 92% typical (at full power)
	COOLING	Forced ventilation
	NOISE	‹ 75dBA @ 2m
	ENCLOSURE	IP44
	COLOUR	Powder-coated RAL 9010
	INTERFACE	Graphic display Digital I/O for control and monitoring

**Specified on order.*

FC100				
SERIES	HEIGHT (MM)	WIDTH (MM)	DEPTH (MM)	WEIGHT (KG)
6 KVA	730	860	365	94
18 KVA	1050	810	470	235
FC200				
36 KVA	1050	620	850	511
85 KVA	1050	1,750	980	719

All specifications are subject to change.

Perfect solution for sensitive equipment.

CN200 CleanNet™ Converter

TOP 3 SELLING POINTS

1. Prevents halogen or LED lights flickering
2. Stops audio and entertainment equipment misbehaving
3. High-power engine room equipment will not compromise guest comfort

Benefits

- Isolates and protects sensitive equipment from power disturbances
- Pure sinusoidal clean output supply
- No interference with sensitive equipment
- Protects equipment from voltage distortion, voltage sags or frequency instability
- Quiet trouble-free operation
- Fully galvanic isolated output supply

Options

- Local bypass control and monitoring
- Cabinet colour

Features

- No crew intervention – black-box design
- Seamless transfer of power between CleanNet™ and bypass
- Monitors power demand for seamless bypass operation
- Automatic transfer to bypass in a converter fault or overload condition
- Automatic transfer to CleanNet™ when system returns to health
- IP44 and 45°C rating as standard

With increasing onboard automation and many different power requirements, it is essential to deliver a clean electrical supply for sensitive loads and guest comfort. Loads sensitive to supply disturbances (such as voltage distortion, sags and frequency instability) can be protected by the installation of a separate supply independent from the ship AC bus.

The CleanNet™ supply is reserved for sensitive loads such as the lighting and entertainment network, while automation, pumps, winches and air conditioning remain powered by the main ships bus.

With CleanNet™ built-in bypass and synchronisation, sensitive onboard equipment has the ultimate protection.

Transfer to CleanNet™ mode is completely automatic and seamless. In the event of alarm or fault condition the converter will automatically bypass to the main ship bus.

The converter operates as a black-box design: protection starts as soon as it is connected to power.

INPUT	TYPE	3-phase active rectification
	VOLTAGE	208 to 480 VAC +/- 10%
	FREQUENCY	50 or 60 Hz +/- 10%
OUTPUT	TYPE	Three phases, neutral, isolated earth*
	VOLTAGE	208 or 120V, 400 or 230 VAC
	FREQUENCY	50 or 60 Hz
	VOLTAGE DISTORTION	‹ 1.5% (linear load)
ENVIRONMENT	PROTECTION	Thermal, overload, short circuit
	OPERATING TEMPERATURE	0 to 45°C
	HUMIDITY	‹ 95% non-condensing
	EFFICIENCY OF SYSTEM	› 92% typical (at full power)
	COOLING	Forced ventilation
	NOISE	‹ 75dBA @ 2m
	ENCLOSURE	IP44
	COLOUR	Powder-coated RAL 9010
	INTERFACE	7.4" Graphical touch-screen Control I/O analogue and digital Modbus RTU RS485
	FEATURES	Auto bypass Load monitoring Harmonic Cancellation

**Specified on order.*

SERIES	HEIGHT (MM)	WIDTH (MM)	DEPTH (MM)	WEIGHT (KG)
36 KVA	1,010	860	815	511
60 KVA	2,000	500	800	623
85 KVA	2,000	620	900	719
150 KVA	985	1,750	980	1,117

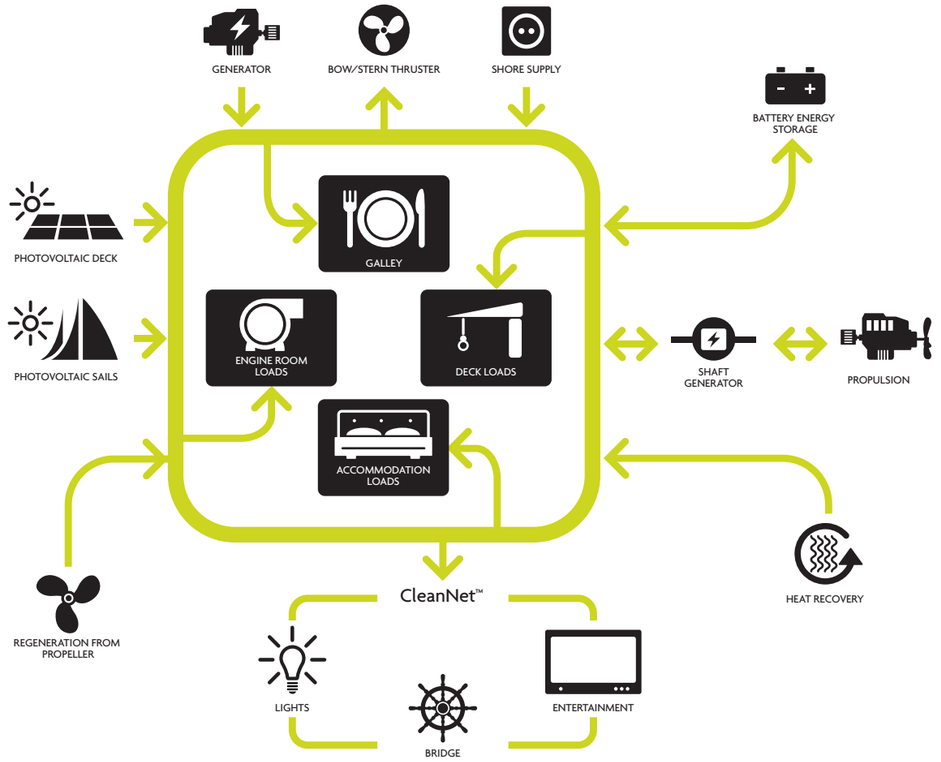
All specifications are subject to change.

The Magnus Marine Smart Grid Technology for super yachts offers maximum efficiency and optimum financial savings together with a greener, cleaner yacht.

SMART GRID TECHNOLOGY

BENEFITS OF SGT

1. Reliable AC platform recognised internationally
2. AC platform throughout all applications maximises ease of use for crew
3. Standard modules and control system for off-the-shelf availability



The ever-growing complexity and possibilities offered in the field of power generation and use has opened the opportunity for Smart Grids.

The revolution in shore-based electrical power distribution in national power grids offers even greater efficiency and flexibility in marine applications especially super yachts. Smart Grid Technology offers huge environmental benefits as well as financial savings.

Traditional power grids consisted of power generation and a load with power flow in a single direction from generation to load.

The new environment has multiple power generation opportunities with power flowing in many directions throughout the grid.

The SGT platform can support the following operations:

1. Shore power in harbour
2. Bow and stern thruster operation
3. Clean power distribution to prevent lights and other sensitive load disturbances such as flicker
4. Battery storage. To optimise generator efficiency and prevent excess exhaust fumes
5. Energy storage can support the AC bus for a prolonged period so generators can be turned off (silent ship operation)
6. Energy storage also operates as an Uninterruptable Power Supply
7. Photovoltaic power can be stored in batteries or used directly on the grid
8. Fully support PTO electric propulsion mode to support the ship AC bus
9. Supports PTI so power for the ship's main propulsion is sourced by the generators and/or battery energy storage (main diesel engines off)
10. PTI boost mode. This includes powering the ship's propulsion through the main diesel engines, generators and battery energy storage
11. Future-proof for incorporation of heat recovery, fuel cells, etc

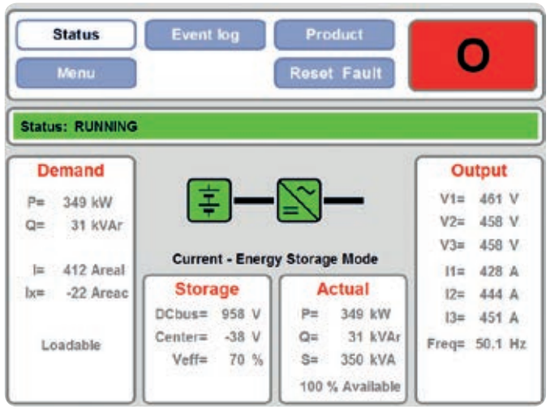
Key features of SGT

- Converters can be permanently connected to the ship AC bus. When enabled the converter will automatically synchronise and come online
- The SGT platform is extremely flexible with regards to paralleling with other voltage sources – either generator or multiple converter units. Parallel load-sharing is achievable using frequency and voltage droop profiles. This allows the converters to share power with other systems without the need for complex supervisory controls
- Isochronous control available.
- Full system redundancy with no common DC bus
- A unique feature critical to the reliability of the converter is the built-in redundancy. In the unlikely event of a fault, the master controller which oversees the power modules will provide a warning notification but allow the system to continue to operate
- Low noise
- Efficiency
- Compact and lightweight

Store and retrieve energy to improve efficiency and comfort.

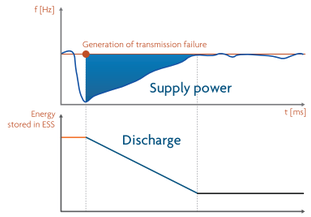
ES200
ENERGY STORAGE

SERIES 50 KWH TO 2 MWH

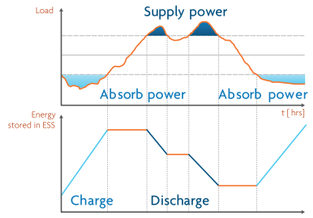


▲ **Converter Display**

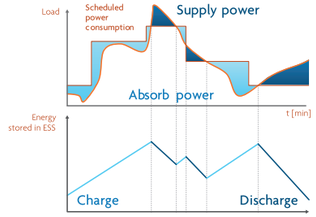
Spinning reserve



Load leveling



Peak shaving



Fully utilising onboard power generation

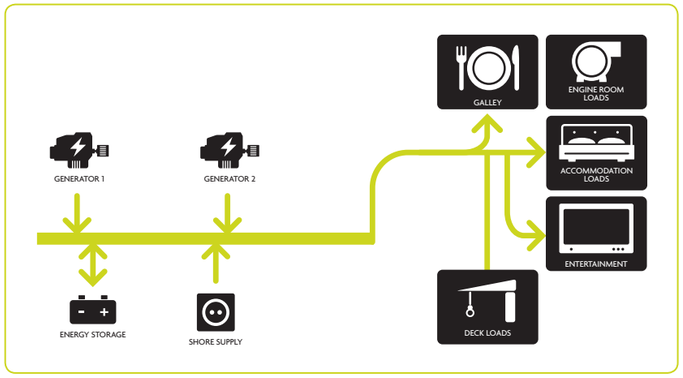
As demand for safe and reliable electricity increases, yachts infrastructure continues to evolve and innovate in order to accommodate such growth. Harnessing the power to control energy can enable current infrastructure to readily expand.

Onboard energy storage systems can increase operational performance, grid reliability and significant energy fuel saving. The benefits of energy storage can span power generation, through transmission and distribution, and all the way to users.

Value and performance

A proven and reliable platform which provides seamless system integration and battery control. Allowing the generator to be taken offline when the energy storage system is fully charged delivers exceptional returns on investment.

ES200 SERIES	CONFIGUTATION	HEIGHT (MM)	WIDTH (MM)	DEPTH (MM)	WEIGHT (KG)
80 KVA	1 Module	1000	1000	850	680
160 KVA	2 Module	1800	800	850	1010
240 KVA	3 Module	1800	1000	1010	1620
360 KVA	4 Module	1800	1200	1010	1950



Key features

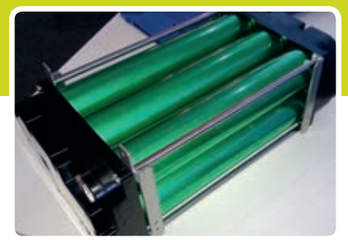
- Peak Shaving - Deliver power to the grid when peak demand is high. Unloading, preventing an additional generator coming online thereby lowering fuel and maintenance costs
- Spinning Reverse - Meet shortfalls; supply backup power during a loss of generation Silent ship operation
- Load levelling - Store energy when demand is low and deliver energy when demand is high

Battery specification

- Lithium-ion Manganese Oxide
- High strength resistant towards vibration and external shocks via employment of cylindrical case (stainless steel and wind around electrolyte
- 3 times charge and discharge performance
- Battery Management Unit monitoring voltage, temperature and charging/discharging
- Operating temperate -20 to 50°C
- Efficiency >96% (end of life)
- 1.7Kw/h = H:151 x W:228 x D:475mm 23kg
- 102Watt hours/litre 76Watt hours/kg
- Life expectancy 8000 cycles

Package includes

- Batteries with plugs and sockets for safe and easy isolation
- Battery Management Unit to monitor each battery and includes safety shut off
- Energy Management Unit with Graphical Display for Control and Monitoring. Control profiles for easy crew accessibility
- 110V battery string isolation for safety
- Upstream current protection from converter and energy storage
- Converter(s) with Graphical Display for Control and Monitoring
- Standalone or remote operation with PMS



Preventing light flicker and reliable power when in harbour.

SP200 150KVA SHORE POWER CONVERTER

CLEANNET™

The experienced owner requested protection of the lighting network to prevent light flicker. The interior and exterior furnishing has a comprehensive array of lighting for entertainment and relaxation. Light flicker would not be acceptable with exhaust burners installed and considerable automation a clean supply could not be guaranteed.

A CleanNet™ Converter was installed to protect and isolate the lighting network with a CleanNet™ Supply.

An internal bypass was installed for automatic and seamless transfer in the event of an overload or fault condition.

SHORE POWER

For clean and pleasant relaxation in harbour the owner requested a reliable shore to ship connection for worldwide marina connectivity. To maximise space onboard the shore power converter was specially modularised. The yacht is located in the Caribbean and Mediterranean and the installation proves to be a reliable system for both crew and owner.

Seamless transfer from generator to shore is controlled by the converter. When in parallel with the generator, a load-shedding routine is enabled to transfer the load.

A local user-display details the status of the system and identifies any shore supply outages with a time and date stamp.

Improving comfort onboard in and outside harbour.

SP200 250KVA SHORE POWER CONVERTER

SHORE POWER

This iconic yacht and one of the stars of the super yacht fleet had no infrastructure to connect to shore power. With rising fuel costs and increased maintenance on generators the owner was looking for solutions. Magnus was chosen to design and oversee the installation of a shore power converter.

A shore selector switch allows connection via a single shore cord where high dock power is available, while a supplementary cord is provided for marinas with limited power availability where two cord connections are required. Energy metres are fitted directly on each shore cord so crew can optimise energy efficiency and help lower operating costs.

With limited ventilation in the compartment space, heat management was a major design criteria. We delivered a compact water cooled unit. As the system is fully sealed noise is kept to an absolute minimum and electronics clean.

CLEANNET™

With high power automation onboard supply disturbances have become the industry norm. When sailing especially during mast rotation, high transient power was causing voltage sags and frequency instability on the ships AC Bus. A CleanNet™ Converter was installed to protect sensitive load centres from these supply disturbances. Light flicker has now been eliminated improving comfort to owner and guests. Load centres included VIP, owner cabins, lounge and the amazing atrium.

The CleanNet™ Converter incorporates a bypass providing seamless reconnection to the ship bus automatically without power disturbance in the event of a warning or fault condition.

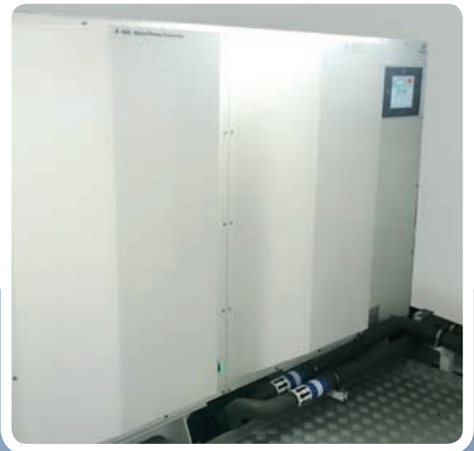
The CleanNet™ has IP54 cabinet integrity and is suitable for engine room installation.

Power quality is guaranteed 24/7.

> “The shore power converter kit is amazing!”
>
> Richard Tatlow
> **Chief Engineer,**
> **SY Maltese Falcon**

Fully sealed water unit – guaranteed performance.

SP200 250KVA SHORE POWER CONVERTER



A reliable shore to ship connection was required on two vessels to be launched in Germany. With our outstanding reliability record and advanced modular system design Magnus was selected.

The 250KVA Shore Power Converter was to be installed in the lower compartment space of the lazarette with a maximum height of 1200mm. Equipped with dual 200Amp shore cords a single 250KVA 400V 50Hz output is delivered to the ship on connection to any shore supply 208 to 480V.

On connection to shore the converter automatically starts and notifies the main switchboard when ready. The crew manually switch on the breaker tie to the ships AC bus. An auxiliary contact off the main breaker enables the converter. The converter automatically senses if a generator is present on the ships AC bus, synchronise and ramp up its power. The two supplies, generator and shore can then run in parallel indefinitely until the crew decide to switch off the generator supply. This can be done by the PMS de-loading sequence.

To maximise compartment space the Shore Power Converter is split into two sections. Both sections have water cooling and are completely sealed to easily regulate the temperature of the compartment. IP56 protection also ensures the operational noise is kept to an absolute minimum.

The system has no internal common DC Bus so has 4 true levels of internal redundancy. Heavy motor loads which turn on and off will not affect sensitive equipment and deliver a stable and well regulated output supply.

Split unit design to facilitate getting the unit onboard.

SP200 600KVA SHORE POWER CONVERTER

An SP_{200} Shore Power Converter was selected to connect the yacht reliably to shore when in harbour. Two independent shore cords with full galvanic isolation was supplied to prevent hull electrolysis and any leakage current sensitive with breakers with RCD protection. A Kw/h digital display measured directly on each shore cord supply provides crew the facility to cross reference energy imported with harbour officials.

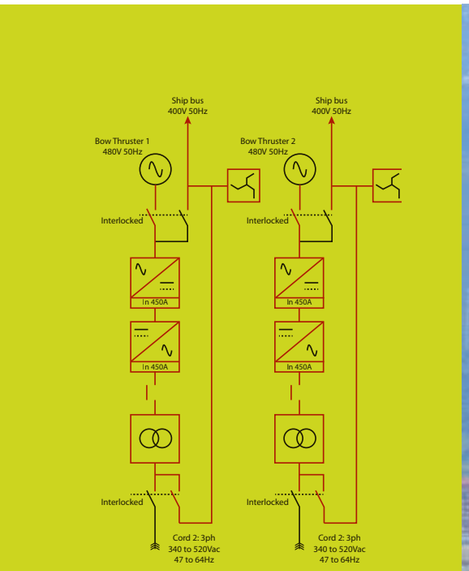
For a quick and economical installation the system needed to be broken down into small sections and reassembled on board to allow the unit to pass through a deck hatch of 800 x 700mm. To maximise space on board the system had taken into account the angle of the hull with a reduced height not to obstruct cable trays and piping. Installed in a lower deck store room the converter was fully sealed and cooled internally by an external chilled fresh water supply. A fully sealed unit prevents any temperature rise in the compartment space.

Standalone operation the converter is configured to automatically start and deliver power when a shore supply is present. The switchboard then is controlled to synchronise to the incoming supply for 100% seamless transfer.

As the store room is not easily accessible from the MCR the graphical display is located in the Main switchboard for motoring and data logging.

Providing reliable shore to ship power
and two independent bow thruster supplies.

SP200 600KVA SHORE POWER CONVERTER



A 600 KVA shore power converter was installed on board to provide a reliable shore to ship connection. When disconnected from shore the converter operates two independent 300kW bow thrusters. All equipment is installed in the aft with 100m cable length between converter and bow.

Active front-end rectification minimises supply disturbances and maximises generator power availability.

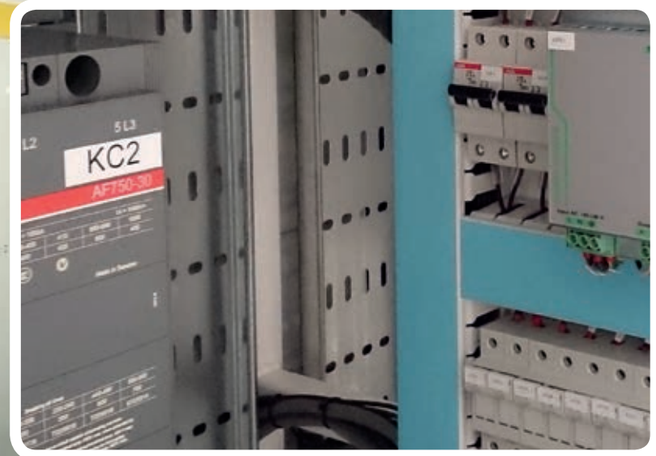
The entire system was installed in a compact compartment space with no external ventilation.

Water cooling by means of heat extraction was installed to maintain compartment temperature.

For reliable transfer from ship to shore the converter synchronises to a live ship bus without any additional power switching or synchronisation procedure. A power limit was also interfaced to the PMS to prevent each separate converter overloading during transfer, and includes a power limit load-shedding routine for a smooth transfer of power to generator.

Shore power with bow and stern thruster control.

SP200 1000KVA SHORE POWER CONVERTER



To improve ship efficiency and maximise space onboard the Shore Power Converter onboard this 100m motor yacht was to have three functions. In harbour a reliable 800kW shore to ship connection with the ability to connect to any shore supply with full isolation. At sea a 500kW bow and 432kW stern thruster.

Magnus scope of supply includes two separate converters and all power automation to switch over the supplies for when in harbour and at sea, all within a single lightweight aluminium cubicle. The system is installed in the engine room and is completely sealed with internal water cooling for ventilation. For material handling when lowering the single cabinet into the vessel a lifting frame has been issued. The lifting frame has been stress modelled with a two times safety factor and is removable when in place. Each converter has active rectification to ensure power taken from shore or the ships bus when in thruster mode creates no AC disturbances: harmonics, voltage distortion or radio frequency interference. The two converters operate independently so the bow and stern thruster can operate at different speed levels. In harbour they provide dual shore cords with a single output to provide a well regulated and stable 400V 50Hz supply.

Internal automation control has taken into account starting the system if the ships generators and batteries are off. Shore Power Converter control is achieved by a single input from the Main Switchboard. Once activated the relevant contactors will energise. If a ships supply is already present the converter will automatically synchronise and come online. A soft start and stop functionality has been adopted to transfer the load to and from generator smoothly without any power snatching.

Each converter has a Power Limit Set Point controlled by the ships PMS. At sea this is adjusted to ensure the generators are not overloaded when the thrusters are both in operation. In shore this has been used to shift the load actively onto other paralleled AC supplies; generator(s) or converter 2.

A true AC to AC platform with no common DC Bus provides full internal redundancy in the unlikely event of a fault condition. Each thruster has five levels of redundancy for improved safety at sea. In harbour this doubles to 10 times level redundancy.

The system is the most advanced Shore Power Converter to be installed on any vessel.

World-class service and support guaranteed.

SERVICE & SUPPORT

We offer an exemplary support package so you enjoy total peace of mind which lasts well beyond purchase and installation.

Our international service agreements have been selected to suit the needs of owners, crew and shipyards. Engineering support is available 24 hours a day, 7 days a week. A choice of service level agreements includes delivery of spare parts and engineer attendance anywhere in the world.

		BRONZE	SILVER	GOLD
TRANSPORTATION	Packaging suitable for international freight	■	■	■
DOCUMENTATION	English user manual Electronic and print copy	■	■	■
	Electrical and mechanical drawings AutoCAD/PDF format	■	■	■
	Factory acceptance test report	■	■	■
PROJECT MANAGEMENT	Commissioning Category 1 Initial power-up Reserve one day		■	■
	Commissioning Category 2 Harbour acceptance Reserve one day		■	■
	Commissioning Category 3 Sea acceptance Reserve one day Applies to bow/stern thruster operation		■	■
WARRANTY	12 months after commissioning, or 24 months after dispatch, whichever sooner	■	■	
	24 months after commissioning, or 36 months after dispatch, whichever sooner			■
CONDITIONS	Free issue parts and engineer	■	■	■
	Engineer's travel at customer's cost	■	■	
	Engineer's travel to a major port at supplier's cost			■
	Delivery of spare parts at customer's cost	■		
	Delivery of spare parts to a major port at supplier's cost		■	■
	Report following on-site servicing or assessment	■	■	■

All specifications are subject to change.

COMMISSIONING OVERVIEW

To guarantee years of dependable shore power, we recommend that one of our engineers attends commissioning. This is included at no extra cost with all Silver and Gold service level agreements. Commissioning is fully documented.

- Internal and external inspection
- Check monitoring and control interfaces
- Electrical check and initial power-up
- Seamless transfer from shore power to generator
- Seamless transfer from generator back to shore power
- Start bow thruster

HEALTH CHECK

All our products are essentially maintenance-free, however an annual service and inspection is recommended. This allows thermal stress and damaged joints or cables which have worked loose during sailing to be fully identified and corrected. All this can be managed by Magnus to guarantee you years of dependable shore power and total piece of mind.

HISTORY:

- Abeking & Rasmussen
- Amels
- BD Yachts
- Couach Yachts
- Devonport
- Feadship
- JFA
- KaiserWerft
- Lürssen
- Mondo Marine
- Nautor's Swan
- Oceanco
- Oyster
- Palmer Johnson
- Pendennis
- Perini Navi
- RMK
- Royal Denship
- Royal Huisman
- Wally